former ensures that all of the phosphorus vapor has to come into contact with silicon surfaces prior to reaching the reactor walls whereas the latter (as described in Nagura) does not. It is clearly the case that the present inventors have developed a significantly different approach to that described by Nagura.

As set out in the paragraph spanning pages 1 and 2 of the present description, pure silicon has a relatively high melting point (1420°C) which makes it difficult to combine molten silicon with elements which have low boiling points such as phosphorus, for example red phosphorus, which has a boiling point of 417°C. This means that when red phosphorus, for example, is brought into contact with molten silicon it vaporizes due to the high temperature of the molten silicon. In turn, this makes it very difficult to contain the phosphorus and to combine it with silicon. Nagura does not recognize this problem and teaches that it is acceptable to heat phosphorus and silicon at the same time, at remote locations, and without maintaining a temperature difference.

The present inventors have identified the advantages associated with applying heat to silicon to establish a temperature difference between at least a part of a silicon layer and a sample of phosphorus (which is surrounded by the silicon) in order that some of the phosphorus is vaporized. In the arrangement described in Nagura, and unlike the present invention, all of the constituents are heated and maintained at a single temperature and are remote from each other. The approach described in Nagura results in substantial quantities of phosphorus being lost to the reactor.

Maintaining a temperature difference between the silicon and the phosphorus in accordance with the present invention is an important distinguishing feature over Nagura. Page 5 (second paragraph) of the present application describes how, by maintaining a temperature difference between the silicon and the phosphorus, it is possible to heat only part of the phosphorus to a temperature in the region of its boiling temperature. In this way, a relatively gradual release of phosphorus vapor may be achieved. If all of the solid phosphorus were heated to the silicon reaction temperature, as in Nagura, then formation of phosphorus vapor would be very rapid, resulting in significant loss before it can be converted.

Nagura simply teaches use of a furnace tube in order to react phosphorus vapor with silicon wafers rather than silicon particles. The method described in Nagura would not be

suitable for use in connection with a mass of silicon particles in accordance with the present invention because the phosphorus and silicon samples are not arranged in such a way to enable a phosphorus vapor to penetrate a multiplicity of particles.

The method in Nagura is used to apply phosphorus to a surface of silicon. Nagura teaches that the phosphorus and silicon wafer are vacuum encapsulated in a tube and heated at the same temperature. Nagura describes how this results in the formation of a diffusion layer of phosphorus on a silicon wafer. It is sufficient in Nagura that only a surface of a wafer is coated. Suppose the silicon wafer in Nagura was replaced with a layer of silicon particles (for example, refer to feature (12) in the present invention in Figure 1) -- the phosphorus vapor generated would not be able to percolate through a significant mass of silicon and react to form the required phosphide. A significant portion of unreacted silicon would remain if the silicon wafer(s) in Nagura were replaced with a sample of silicon particles. With regard to the teaching of Aston, there is no suggestion in this document regarding the features from claim I on which Nagura is silent, including (i) surrounding a sample of phosphorus with a layer of silicon and (ii) establishing a temperature difference between at least part of a silicon layer and a sample of phosphorus.

As such, it is considered that the subject matter of the claims presently on file cannot be rendered obvious to one of ordinary skill in the art based on the disclosure of Nagura in combination with that of Aston.

All outstanding issues have been addressed and this application is in condition for allowance. Should any minor issues remain outstanding, the Examiner should contact the undersigned at the telephone number listed below so they can be resolved expeditiously without need of a further written action.

The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, in the fee(s) filed, or asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 14-1140.

Respectfully submitted,

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